## REMARKS

In the Office Action dated June 13, 2002, claims 1-10 were rejected under 35 U.S.C. § 102(b) as being anticipated by US Patent 6,150,193, issued to Glenn (hereafter referred to as "*Glenn*"). Also, claims 11-20 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over *Glenn*, in view of US Patent 6,316,838, issued to Ozawa et al., (hereafter referred to as "*Ozawa et al.*"). Claims 4 and 14 were objected to under 37 CFR § 1.75 as being a substantial duplicate of claims 3 and 13. Finally, claim 1 was rejected under 35 USC § 112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter the Applicant regards as the invention.

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

Overview of the Claimed Invention:

An integrated circuit has a plurality of regions that includes conductors to provide interconnectivity for the integrated circuit chip. As set forth in amended claim 1, a first region on the metal layer has a first preferred wiring direction to more efficiently utilize the space on the metal layer region. The first preferred direction defines a direction, relative to the boundaries of the integrated circuit, for at least fifty percent of conductors on the metal layer. A second region, located on the same metal layer as the first region, has a preferred wiring direction for the conductors in its region different than the

preferred diagonal direction of the first region. A wire deposed in a Manhattan direction in a region that has a preferred diagonal direction is referred to herein as a "zag." For example, a section may have a diagonal preferred direction (*e.g.*, plus 45 degrees), and the section may also include wires deposed in a horizontal direction.

An integrated circuit has a plurality of metal layers that includes conductors to provide interconnectivity for the integrated circuit chip. As set forth in amended claim 11, a first metal layer has a first preferred wiring direction. The first preferred direction defines a direction, relative to the boundaries of the integrated circuit, for at least fifty percent of conductors on the first metal layer. A second metal layer has a second preferred wiring direction that defines a direction, relative to the boundaries of the integrated circuit, for at least fifty percent of conductors on the second metal layer. At least one zag conductor is arranged in a Manhattan direction and are coupled to one of said the conductors arranged in a first preferred diagonal direction

**Rejection of the Claims Under 35 U.S.C. § 102 and § 103**

**A. *Glenn* Does Not Disclose Arranging At Least Fifty Percent Of Conductor In A Preferred Direction.**

Amended claim 1 recites "said preferred diagonal direction conductors comprising at least fifty (50) percent of said conductors in said region." *Glenn*, in **Figure 8C**, shows a plurality of conductors. Some of the conductors are deposed in a diagonal direction,

while the other conductors are deposed in Manhattan directions (*i.e.*, vertical and horizontal). Specifically, eight conductors are configured in Manhattan directions; three conductors are deposed in a first diagonal direction and four conductors are deposed in a second diagonal direction. Thus, in *Glenn*, there is no preferred diagonal direction for at least fifty percent of the conductors in a region as claimed in amended claim 1. Accordingly, *Glenn* does not render claim 1 obvious because *Glenn* does not disclose or suggest a region of a metal layer with a preferred diagonal direction for at least fifty percent of the conductors in the region.

Amended claim 11 sets forth "at least fifty (50) percent of said conductors on a first metal layer being deposed in a first preferred diagonal direction." Again, *Glenn* does not disclose or suggest a metal layer with a preferred diagonal direction for at least fifty percent of the conductors in the metal layer.

**B. At Least Fifty Percent Of Conductors Arranged In A Preferred Direction Maximizes Efficiently Of The Layout.**

Applicants respectfully contend that is well known in the art to lay out conductors on a metal layer in a "preferred direction." Typically, wires are arranged in horizontal and vertical directions on alternating metal layers of an integrated circuit. Fifty percent of conductors arranged in a preferred direction provides a general design rule to maximize the number of conductors in an area.

The specification discloses the technique of laying out conductors in a grid. A grid of equally spaced lines is configured in a preferred wiring direction. The Specification discloses:

> Typically, wires are placed on a grid to define spacing between potential "tracks" for placement of wires on that layer. For example, a grid may define spacing between rows of tracks in a metal layer that has a preferred horizontal direction. Thus, grids are used to define minimum spacing between wires or "tracks" on a metal layer in the preferred direction. (Specification, paragraph 0042).

Thus, the claimed limitations of "at least fifty (50) percent of said conductors" is significant because the claim defines a predominate conductor direction that maximizes placement of conductors in an area.

**C. *Ozawa et al.* Do Not Disclose A Plurality Of Regions With Different Preferred Directions.**

The Office Action cites Figures 4 and 5 of *Ozawa et al.* for showing "a metal layer having a plurality of conductors, wherein the conductors are deposed in a preferred diagonal direction." (Office Action, page 7). Figure 4 discloses a front surface 33A of a substrate 33. The substrate includes first extended wires 59. (Col. 5, lines 39 – 62). Figure 5 shows the back surface 33B of substrate 33. Second extended wires 62 are formed on the back surface of substrate 33. As such, *Ozawa et al.* do not render claim 1 obvious because *Ozawa et al.* does not disclose a metal layer with two regions, such that a first region has conductors arranged in a preferred diagonal direction and a second

region has conductors arranged in a preferred direction, different than the preferred diagonal direction.

**D. *Ozawa et al.* Do Not Disclose A Plurality Of Metal Layers With Different Preferred Diagonal Directions.**

Amended claim 11 recites:

*at least fifty (50) percent of said conductors on a first metal layer being deposed in a first preferred diagonal direction, ...*

*at least fifty (50) percent of said conductors on a second metal layer arranged in a second preferred diagonal direction.*

The conductors on the front and back of substrate 33 are not configured "in a first preferred diagonal direction" and "a second preferred diagonal direction." Accordingly, *Ozawa et al.* do not render claim 11 obvious.

Dependent Claims:

Dependent claims 2-3 and 5-10 are depend, either directly or indirectly, upon independent claim 1, and therefore for the same reasons claim 1 is patentable over the cited references, claims 2-3 and 5-10 are also patentable over the cited references. Also, dependent claims 12-13 and 15-20 are depend, either directly or indirectly, upon

independent claim 11, and therefore for the same reasons claim 11 is patentable over the cited references, claims 12-13 and 15-20 are also patentable over the cited references.

## CONCLUSION

In view of the foregoing, it is submitted that the claims are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.

Respectfully submitted,

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## The Amended Claims

The following pages provide the amended claims with the amendments marked with deleted material in [brackets] and new material underlined to show the changes made.

1. (Once Amended) An integrated circuit comprising:

at least one metal layer comprising [at least one] a plurality of regions, wherein a first contiguous [said] region comprises [comprising] an area of said metal layer of at least 100 square microns and comprises [comprising] a plurality of conductors to interconnect points on said integrated circuit, said conductors comprising a plurality of preferred diagonal direction conductors and at least one zag conductor, and wherein a second contiguous region comprises a plurality of conductors such that at least fifty (50) percent of said conductors are arranged in a preferred direction other than said preferred diagonal direction;

said preferred diagonal direction conductors comprising at least fifty (50) percent of said conductors in said first region and being deposed in a preferred diagonal direction[, wherein said preferred diagonal direction defines a direction] that forms a Euclidean angle relative to the boundaries of the integrated circuit; and

said at least one zag conductor being deposed in a Manhattan direction and being coupled to one of said preferred diagonal direction conductors so as to interconnect points on said integrated circuit using at least one zag conductor and at least one preferred diagonal direction conductor.

11. (Once Amended) An integrated circuit comprising:

[at least one] a plurality of metal layers with each metal layer comprising a plurality of conductors to interconnect points on the integrated circuit, at least fifty (50) percent of said conductors on a first metal layer being deposed in a first preferred diagonal direction, wherein said first preferred diagonal direction defines a direction that forms a Euclidean angle relative to the boundaries of the integrated circuit, for at least fifty percent of conductors on said first metal layer; [and]

at least fifty (50) percent of said conductors on a second metal layer arranged in a second preferred diagonal direction, wherein said second preferred diagonal direction defines a direction, different than said first preferred diagonal direction, that forms a Euclidean angle relative to the boundaries of the integrated circuit; and

at least one zag conductor, coupled to a conductor deposed in a first diagonal direction, said zag conductor being deposed in a Manhattan direction so as to interconnect points on said integrated circuit using at least one zag conductor and at least one conductor arranged in said first preferred diagonal direction [conductor].

12. (Once Amended) The integrated circuit of claim 1, wherein said first preferred diagonal direction comprises plus 45 degrees and said second preferred diagonal direction comprises minus 45 degrees relative to the boundaries of said integrated circuit.

13. (Once Amended) The integrated circuit of claim 1, wherein said first preferred diagonal direction comprises minus 45 degrees and said second preferred diagonal direction comprises plus 45 degrees relative to the boundaries of said integrated circuit.

15. (Once Amended) The integrated circuit of claim 1, wherein said first preferred diagonal direction comprises plus 60 degrees and said second preferred diagonal direction comprises minus 60 degrees relative to the boundaries of said integrated circuit.

16. (Once Amended) The integrated circuit of claim 1, wherein said first preferred diagonal direction comprises minus 60 degrees and said second preferred diagonal direction comprises plus 60 degrees relative to the boundaries of said integrated circuit.

17. (Once Amended) The integrated circuit of claim 1, wherein said first preferred diagonal direction comprises plus 30 degrees and said second preferred diagonal direction comprises minus 30 degrees relative to the boundaries of said integrated circuit.

18. (Once Amended) The integrated circuit of claim 1, wherein said first preferred diagonal direction comprises minus 30 degrees and said second preferred diagonal direction comprises plus 30 degrees relative to the boundaries of said integrated circuit.